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BULLETIN  
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New Species of Ustilagineae and Uredineae.

BY J. B. ELLIS AND B. M. EVERHART.

USTILAGO WASHINGTONIANA E. & E.

On leaves of some grass, State of Washington, spring of 1892 (E. R. Lake).

Sori linear, 1 mm.—2 cm. long, covered at first by the lead-colored epidermis, soon exposed and then mass of spores nearly black. Spores globose, 8–10  $\mu$  diam., olive-brown, minutely echinulate and filled with numerous small nuclei. The sori are sunk in the substance of the leaf, which is finally eaten away and perforated by them.

Closely resembles *Ustilago longissima* (Sow.), but the spores are larger and minutely echinulate.

ENTYLOMA ARNICALIS E. & E.

On leaves of *Arnica cordifolia*, Latah county, Idaho, July, 1893 (C. V. Piper, No. 122).

Spots amphigenous, deep rusty brown above, paler below, subangular, 2–4 mm. diam., with a pale yellow shaded border. Sori subepidermal. Spores spherical, hyaline at first, then pale brown, 10–12  $\mu$  diam., with a smooth epispore  $1\frac{1}{2}$ –2  $\mu$  thick. Conidia (*Ramularia arnicalis* E. & E. Proc. Acad. Nat. Sci. Phil. 1891, 85) hypophyllous subcylindrical  $15\text{--}20 \times 2\frac{1}{2}\text{--}3$   $\mu$ , 2–3-nucleate, the upper end mostly a little curved, borne on subfasciculate hyphae  $12\text{--}20 \times 2\frac{1}{2}\text{--}3$   $\mu$ .

UROMYCES PULCHELLUS E. & E.

On leaves and petioles of *Silene?* sp. Lake Chelan, Wash. Aug. 1892 (Lake & Hall).

III. Sori scattered or circinate, mostly hypophyllous, small ( $\frac{1}{2}$  mm.), naked, nearly black. Teleutospores obovate or elliptical, becoming chestnut-brown,  $22-28 \times 18-22 \mu$ , epispore smooth, rather thick, moderately thickened at the rounded apex. Pedicels  $35-50 \mu$  long, stout, hyaline. There was no indication of any *Aecidium* on the specimen examined.

UROMYCES CARICINA E. & E.

On leaves or culms of *Carex scoparia*, Alcove, N. Y., July, 1893 (C. L. Shear, No. 81). II. & III.

Sori scattered, oblong,  $\frac{1}{2}-1$  mm. long by about  $\frac{1}{3}$  mm. wide, covered by yellowish epidermis, not confluent. Uredospores sparingly mixed with the teleutospores in the same sori, ovate or elliptical, pale, tuberculo-echinulate,  $20-22 \times 14-16 \mu$ . Teleutospores obovate, pale below, rounded at the apex, or often with a distinct hyaline papilla, epispore smooth, strongly thickened and dark colored at the apex,  $19-23 \times 14-16 \mu$ . Pedicels yellowish, about as long as the spores.

*Uromyces Caricis* Pk. has naked cinnamon-colored sori and larger spores.

PUCCINIA TRIFOLIATA E. & E.

On *Tiarella trifoliata* Seattle, Wash. June 1892 (Prof. C. V. Piper).

I. Aecidium on the slightly swollen stems and petioles. Erumpent, closed at first, soon open and cup-shaped, about  $\frac{1}{2}$  mm. diam., thin, margin toothed. Spores ovate or subglobose,  $15-20 \mu$  diam., yellowish, epispore slightly echinulate, amphigenous.

II. Uredo sori small, pale cinnamon color,  $\frac{1}{3}-\frac{1}{2}$  mm. diam., naked above. Uredospores obovate or globose,  $15-22 \mu$  in the longer diam., rather closely echinulate, hyaline, becoming pale brown.

III. Teleutospores in larger (1 mm.) nearly black naked sori, elliptical,  $22-35 \times 15-20 \mu$ , pale chestnut brown, rounded at each end, contents granular, scarcely constricted at the septum, epispore scarcely thickened at the apex, and when examined dry, under a high power, covered with a network of raised lines. Pedicels very short, almost wanting.

Differs from the other related species on *Tiarella* and *Saxifraga* in the presence of *Uredo* and also in other particulars.

PUCCINIA SUBSTERILIS E. & E. [N. A. F. 3141.]

On *Chrysopogon* sp. Fort Collins, Colo., March, 1894 (C. F. Baker, No. 219).

Mostly hypophyllous. Sori (II. and III.) superficial, pulvinate, elliptical, black-brown,  $\frac{1}{2}-1$  mm. long, naked. Uredospores

echinulate, globose or elliptical,  $20-30 \times 18-22 \mu$ , brownish-black, epispore nearly equally thickened throughout; pedicels slender hyaline, subpersistent,  $20-30 \mu$  long. Teleutospores (in the same sori as the uredospores), oblong or clavate, pale, constricted at the septum,  $22-30 \times 12-15 \mu$ , epispore smooth, mostly not at all or only slightly thickened at the rounded or subtruncate apex.

The uredospores are abundant and well developed, while the teleutospores are few in number and apparently not well matured.

This is quite distinct from *P. omnivora* E. & E. and from *P. Chrysopogi* Barcl.

PUCCINIA OMNIVORA E. & E. [N. A. F. 3049.]

On *Chrysopogon nutans*, leaves and stems, Newfield, N. J., autumn 1893.

II. and III. Uredospore sori minute, narrow, 1-2 mm. long, at first covered, then rupturing the epidermis and discharging the yellow, globose or subelliptical,  $18-22 \mu$ , subechinulate spores.

III. Sori amphigenous, but mostly hypophyllous, oblong or linear, 1 mm.-1 cm. long,  $\frac{1}{3}$  mm. wide, at first covered, but soon bare and margined by the ruptured epidermis, nearly black. Teleutospores elliptical to oblong,  $22-40 \times 12-16 \mu$ , scarcely constricted, mostly rounded at each end, but those in the center of the sori narrower and paler, and gradually attenuated into the stout,  $50-70 \times 4-6 \mu$ , yellowish-hyaline pedicel, upper cell darker, and in the shorter, elliptical spores mostly rounded at the apex without any distinct papilla, the narrower, paler spores with a distinct yellowish-hyaline obtusely conical papilla, epispore smooth, distinctly thickened at the apex.

Has the habit of *P. graminis*, but the spores are decidedly smaller, both the uredo and teleutospores.

PUCCINIA MAGNOECIA E. & E.

On leaves of *Aster pulchellus*, Mts. above Lake Chelan, Wash., Aug. 1892 (Lake & Hall).

III. Teleutospores slender-clavate,  $40-50 \times 14-16 \mu$ , pale-brown, almost hyaline below, epispore smooth, much thickened at the apex and darker, slightly constricted, crowded in broad (2-3 mm.), bullate, nearly black, hypophyllous sori, which are partly covered by the epidermis. The upper surface of the leaf is marked by reddish-brown spots corresponding to the sori on the opposite side. The spores are mostly regularly rounded at the apex, but sometimes obtusely pointed or even truncate. Pedicels about as long as the spores.

Differs from *P. Asteris* in its large, dark sori.

## PUCCINIA PHILIBERTIAE E. &amp; E.

(*P. Gonolobi* Rav. var. *Philibertiae* Pk. in M. E. Jones' list of western plants, not described.)

On leaves and follicles of *Philbertia viridiflora*? Britton and Rusby, near Las Cruces, New Mexico, Oct., 1892 (E. O. Wooton, No. 43).

Amphigenous, but mostly hypophyllous. Sori hemispherical, dark chestnut brown,  $\frac{1}{2}$ – $\frac{3}{4}$  mm. diam., superficial, mostly circinate around a compact central group of several confluent or connate sori; on the follicles the sori are densely crowded, covering the entire follicle, which is thus dwarfed and rendered abortive. Teleutospores elliptical or obovate,  $20\text{--}30 \times 15\text{--}20 \mu$ , scarcely constricted, rounded and obtuse at the apex, lower cell a little paler and often narrowed at the base, epispore smooth, scarcely thickened at the apex, contents of the cells granular. Pedicels slender, subhyaline,  $55\text{--}65 \mu$  long. Mesospores abundant, mostly smaller.

## PUCCINIA ZIZIAE E. &amp; E.

On leaves of *Zizia cordata*, Pullman, Wash., September, 1893 (Prof. C. V. Piper, No. 164).

III. Amphigenous but mostly epiphyllous. Sori small ( $\frac{1}{4}$ – $\frac{1}{2}$  mm.), not confluent, nearly black, soon naked; seated on small (1–2 mm.), whitish, irregularly shaped spots, which are often confluent. Teleutospores obovate, elliptical or oblong-elliptical,  $22\text{--}30 \times 15\text{--}20 \mu$ , only slightly constricted; epispore smooth, rather thin or only slightly thickened at the rounded apex. Pedicels hyaline, about as long as the spores.

Differs from *P. bullata*, in its darker sori, smaller spores and, as far as yet known, in the absence of any *Accidium*.

## PUCCINIA NIGROVELATA Ell. &amp; Tracy.

On *Cyperus strigosus*, Mississippi (Tracy). II & III.

Uredospores in short (1–2 mm.), oblong-elliptical sori, surrounded by the erect margin of the ruptured epidermis, ovate or elliptical, pale yellowish, aculeolate,  $15\text{--}24$  (mostly  $15\text{--}20$ )  $\times 12\text{--}15 \mu$ , mass of spores cinnamon colored. Teleutospores in flat sori, 1–3 mm. long,  $\frac{3}{4}$ –1 mm. broad, closely covered by the epidermis, which appears black by translucence, clavate-oblong,  $35\text{--}55 \times 14\text{--}18 \mu$ , broadly constricted, lower cell pale and narrowed to the pedicel, upper cell broader and darker, epispore smooth, thickened at the apex, which is either rounded or obtusely pointed, with or without a hyaline papilla. Pedicels mostly shorter than the spores. The teleutospore sori at length open by a longitudinal crack along the middle.

## PUCCINIA CLADII Ell. &amp; Tracy.

On *Cladium effusum*, Ocean Springs, Miss., Aug., 1889 (Prof. S. M. Tracy). II. & III.

On the culms and peduncles of the cyme. Sori small, elliptical, subconfluent, so as often to envelope and cover the peduncles for 2 or more cm. in extent; at first covered, then bordered by the ruptured yellowish epidermis. Uredospores ovate or elliptical,  $22-25 \times 20 \mu$ , or subglobose,  $18-20 \mu$ , at first hyaline, then deep red-brown (or ferruginous-yellow while lying in the sori) aculeate. Teleutospores in similar but much darker colored sori, clavate or oblong,  $45-60 \times 18-22 \mu$ , constricted, deep brown, lower cell narrower and paler, epispore smooth or slightly granular-roughened above, strongly thickened at the obtusely rounded apex, or with an oblique papilla, or sometimes subtruncate-flattened. Pedicels shorter than the spores, hyaline or slightly colored, stout. The uredospores are also pedicellate.

## PUCCINIA GRANULISPORA Ell. &amp; Galloway.

On stems and leaves of *Allium cernuum*? Montana, 1890 (Prof. F. D. Kelsey).

II. and III. Sori linear,  $\frac{1}{4}$ –1 cm. long, shorter on the leaves,  $\frac{1}{2}$  mm. wide, at first covered, then exposed by a longitudinal cleft in the epidermis, but only slightly prominent. Uredospores subglobose, pale, faintly echinulate,  $20-30 \times 15-20 \mu$ . Teleutospores oblong, clavate or obovate,  $45-60 \times 20-25 \mu$ , smooth, with granular contents, slightly constricted, upper cell subglobose or elliptical, darker, moderately thickened at the rounded or obtusely pointed or often truncate apex, lower cell paler, cuneate. Pedicels shorter than the spores, colored. Mesospores not abundant, shorter, obovate,  $20-23 \mu$  long.

Differs from *P. Porri* in its linear sori and larger teleutospores.

## AECIDIUM CYLINDRICUM E. &amp; E.

On leaves of *Houstonia angustifolia*, Osborne, Kansas, June, 1894 (C. L. Shear).

Spermogonia? Aecidia hypophyllous, subseriate along each side of the midrib, white, cylindrical, about 1 mm. high, margin minutely subfimbriate-dentate. Spores orange-red, angular-globose, smooth,  $18-22 \mu$ . The upper side of the leaves is more or less blackened and papillate from the projecting bases of the aecidia.

Differs from *Aecidium houstoniatum* Schw. in its elongated, cylindrical aecidia.